

Environmental Monitoring Report Guidelines

A black and white photograph of a wading bird, possibly a spoonbill, standing in shallow water. The bird is facing left, with its long, straight bill pointing downwards. Its body is white with dark feathers on its wings and back. The water is calm, creating a clear reflection of the bird. In the background, there are some reeds or tall grasses.

Environmental Resource
Regulation Department

South Florida Water
Management District
2nd Edition – Dec 2007

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PURPOSE

The development of these guidelines was initiated to establish accurate and consistent monitoring report guidelines for the South Florida Water Management District and provide a standardized report format for the public. Specifically the report guidelines provide:

- Standardized format which will allow for consistency in reviewing data
- Useful and consistent information that can be used in determining compliance status and overall success in mitigation projects

This document also discusses other items which may be required by the Environmental Special Conditions of the permit. Additional reporting enhancements, including electronic submittal of monitoring reports (i.e., through e-permitting), may be available in the future.

Glossary

ecotone - a narrow and fairly sharply defined transition zone between two or more different ecosystem or community types. Such edge communities are typically species-rich.

ecosystem/community type - the native vegetation ecological community considered together with non-living factors of the environment as a unit (e.g. marsh, wet prairie, hardwood swamp, etc.).

exotic plant species – plant species that are non-native, purposely or accidentally introduced by humans to a geographic area. Many are invasive in nature and disrupt native plant communities.

hydrology – water depth, flow patterns and duration and frequency of inundation as influenced by precipitation, surface runoff and groundwater.

macroinvertebrates - The term is traditionally used to refer to aquatic invertebrates including insects, crustaceans, and worms which inhabit a river channel, pond, lake, or wetland. Their abundance and diversity have been used as an indicator of ecosystem health and of local biodiversity. They are a key component of the food chain.

nuisance plant species – plant species which have the potential to dominate disturbed or created mitigation areas and form large vegetative colonies (e.g. cattail, spatterdock, Carolina willow). These species can be native to the geographical area.

quadrat - the basic sampling unity for vegetation surveys. The size of the quadrat depends largely on the vegetation that is being assessed, and may range from 1 X 1 m² for grasslands to hundred or thousands of square meters for forests

strata - layers in a plant community, such as 'overstory', 'understory', 'shrub layer', and 'ground layer'.

transects - lines that are set out through vegetation for the purpose of collecting data. Measurements of species' presence or absence, cover, height etc are made at measured intervals (regular or random) along the transect.

TYPICAL COVER PAGE

Environmental Monitoring Report

Permit Number, Application Number and/or Consent Order Number

Permittee, Property Owner or Agent

Report Type (e.g. Baseline, Time Zero, First Annual etc.)

Date Submitted

Consultant or Contact Person

Consultant or Contact Phone Number

INTRODUCTION

Mitigation Project Objective and Description

Sampling Dates and Climatic Conditions

Permit No., Application No. and/or Consent Order No.

Project Phase (if applicable)

Current Mitigation Construction Schedule (including earthwork, exotic and nuisance maintenance, submittal of financial assurance and conservation easement documents (hardcopy and electronic format)

Monitoring Reporting Schedule (including completed and outstanding reports)

SITE LOCATION AND DESCRIPTION

Figure 1. Site Location Map

Scaled map showing specific location in relation to regional features (i.e. roads, canals, etc.). Aerial Photograph with Project Overlay is also acceptable.

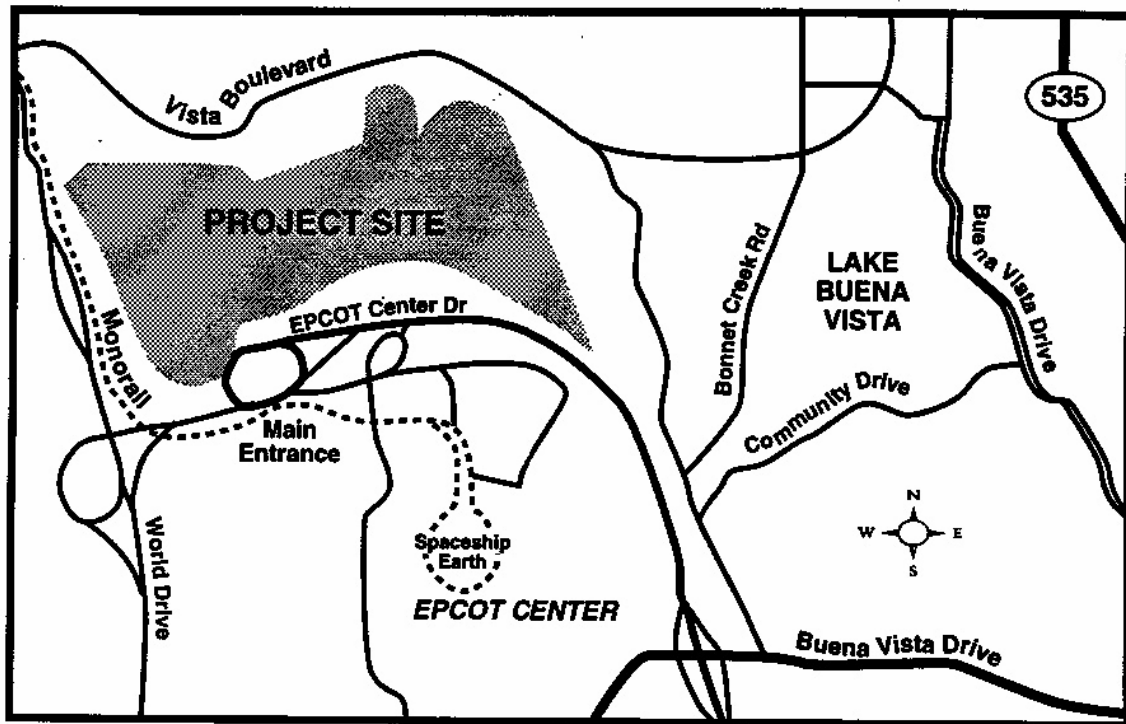
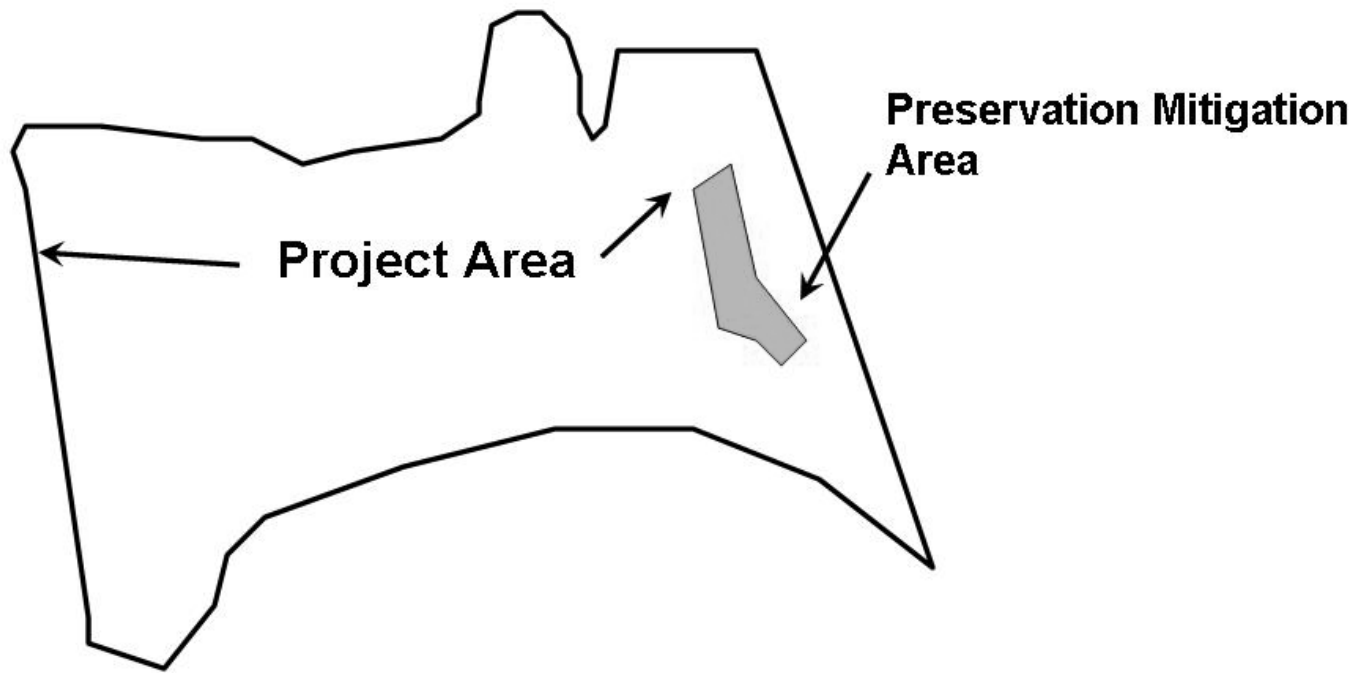


Figure 2. Detailed Site Map

Map showing location of wetland within project.



FIELD SAMPLING DESIGN

Figure 3. Typical Wetland Area Monitoring Layout to scale (example shows agriculture application).

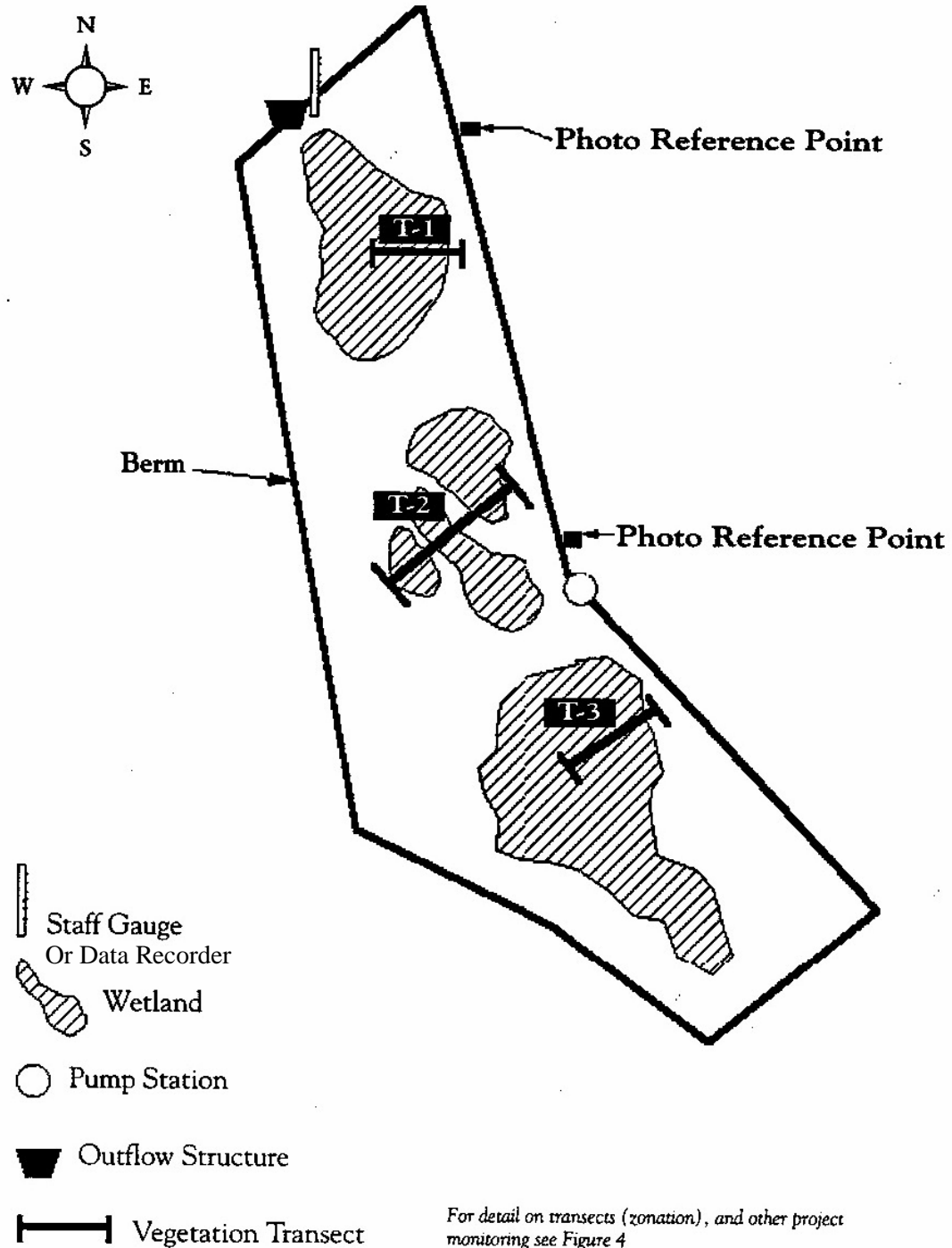


Figure 4. Wetland Plan View showing location of transect through wetland areas to be monitored. (Location of rain gauge, and staff gauge(s) should be provided with each report, where applicable):

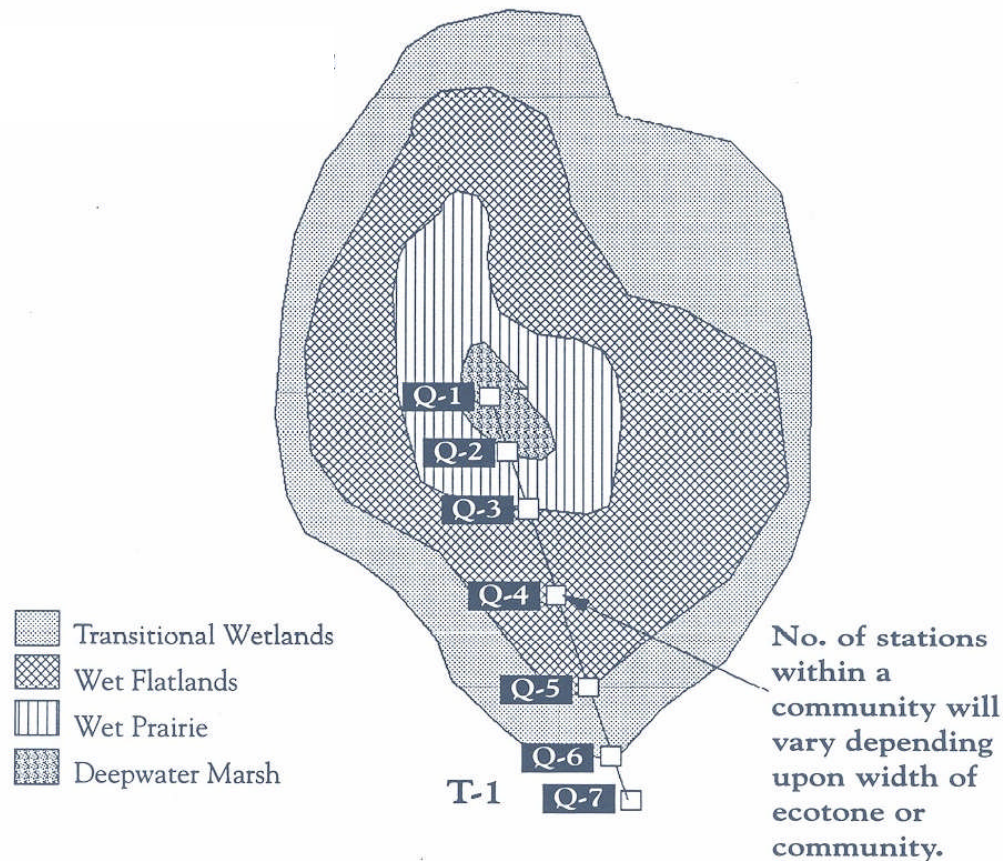


Table applies for each wetland and quadrat to be monitored.

Wetland "X"	Baseline	1st Annual	2nd Annual	3rd Annual	4th Annual	5th Annual
COVERAGE						
T1-Q1						
Spp.1	%	%	%	%	%	%
Spp.2	%	%	%	%	%	%
Spp.3	%	%	%	%	%	%
Spp.4 (etc.)	%	%	%	%	%	%
T1-Q2 (etc.)						

Comments for Wetland "X": Comments should reflect overall condition of the wetland for each reporting period.

SAMPLING METHODOLOGY

Each quadrat (if method chosen) along the transect should be sized based on the type of community encountered within that ecotone. For example, a quadrat for the canopy layer of a mature hardwood swamp should be considerably larger (e.g. 10 meter sq.) vs. that for the groundcover layer of a wet prairie community (e.g. 1 meter sq.). Size, location and numbers of quadrats should remain consistent, throughout all monitoring reports for the project, unless modified or agreed to by District compliance staff.

Line intercept transects are commonly used to measure shrub or tree cover, species composition, density, height and frequency. Line intercept transects can be used when the study area is large and the tree/shrub communities are homogeneous. Line point transects are often used to measure understory vegetation, such as grasses and forbs. The transect should be long enough to sample the plant community, but it should not connect two different communities. Plants, litter and bare ground or rock are recorded at measured or paced intervals along the transect lines.

Monitoring of seagrass is typically evaluated using multiple transects or by utilizing permanent grids (usually 10mx10m) – see Appendix 1. The data is then presented in coverage maps – see Appendix 2.

Sample area should be characterized by:

- * Dominant Species – Composition of 80% or greater
- * Other Species - < 20% Coverage
- * Significant Indicator Species – Individuals or %
- * Bare ground and/or Open Water

Additional Guidelines:

- Transect Stations should be set up from 0+00 to infinity.
- Quadrats or line intercepts should be sized to accurately reflect the community type.
- Report should include survivorship data for planted tree species.
- Individual plant strata coverage should not exceed 100%.
- All monitoring transects need to reflect the hydrological and vegetative gradients of the site. Identification and setup of monitoring transects/grids, chosen to encompass a hydrological and vegetative gradient, should be established before work begins (Appendix 5).
- Monitoring techniques should address the following: timelines, guidelines, success criteria, monitoring, adaptive management plan, and equipment use and calibration.

General Description of Site Condition:

- Land use, adjacent land use, etc.

Unless specified otherwise by permit conditions, sampling should be conducted semi-annually (e.g., April/May and Sept/October), to reflect both wet and dry season conditions, with reports submitted annually.

* *With a breakdown of each species and % coverage*

Vegetation Sampling

Transect Location and Length:

No. of Sampling Stations:

Percent Cover Calculation Methodology:

Community Types or Ecotones:

Water Depth at each Station:

Detail: Each vegetative community type should be represented in the transect(s). Establish one station at each interface of each ecotone. Depending on the width of the ecotone, intermediate stations may need to be established. Document natural ground elevations at each station. Vegetative species that may indicate shifts in community types (including exotic and invasive plant species) should also be noted. The same transects and stations should be used for all monitoring events, unless changes to locations are requested by District staff. Provide common name, genus and species for each plant noted.

Photographic Documentation

Date stamped quality color photographs (either hard copy or digital) should be taken at fixed stations 90 degrees to the transects (see Appendix 3). For larger wetlands, panoramic photographs should be submitted. Additional photographs should be included to highlight other perturbations (e.g., erosion, encroachments, exotic and nuisance plants, etc.). Photographs should be taken during all monitoring events.

Aquatic Macrofauna Sampling

Fish (summary):

Macro-invertebrates (summary)

(Include fish and macroinvertebrate tables in appendix)

Detail: Qualitative samples of small forage fishes and aquatic macroinvertebrates (if required) should be obtained with a dip net, throw net, traps or small seine from inundated portions of the wetland at each habitat category or zone along the transect (minimum 2 samples) to document the presence and relative abundance of food chain organisms. Identification to species level should be made, if possible.

Fish and Wildlife Observations

Observation type: (i.e., observations, roosting, calls, rooting, rubs, scats & tracks). Observations should be site specific. Document utilization of the area by wading birds and other organisms higher in the food chain. Provide update of usage of wildlife platforms in installed.

Detail: Provide table in appendix listing common name, genus and species.

Hydrology

Source: (i.e. rainfall, surface water, pump system, groundwater)

Total Monthly Rainfall: Rain gauges should be located on the project site or in close proximity to the site and recorded on a weekly basis (minimum).

Water level monitoring

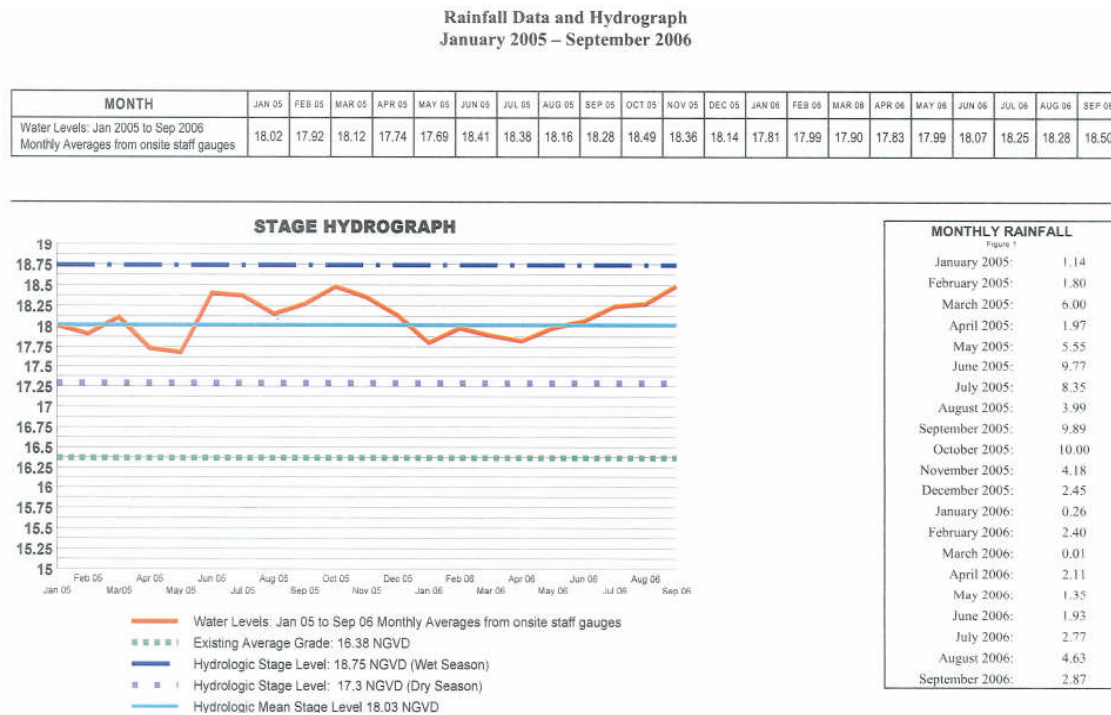
Staff gauge(s) – should be located near the water control structure and set to NGVD (at base of staff gauge – weekly readings (minimum)). Provide fixed control elevation at the time of monitoring (See Figure 6, Pg 13). Ground level elevation(s), at the location of the staff gauge(s), need to be provided in order to determine water level fluctuations above and below ground. This information should also be provided for piezometers and/or monitoring wells.

Piezometer(s) – used in instances where below groundwater level readings are needed. Hand measurements are taken.

Continuous recording equipment – installed in groundwater monitoring wells. Utilized in situations where the sampling stations are remote and/or frequent readings are needed. Data downloaded on a laptop computer.

Flow meters (for rivers, creeks etc.)

Figure 5. Example of Water Level Hydrograph w/ rainfall data.



Water Quality Monitoring

The report should include any unusual water quality issues observed during the monitoring event (e.g., turbidity, etc).

Results and Discussion

Sampling Results - The results and discussion section should provide a summary of the overall data (i.e. Vegetation, Wildlife, Hydrology and Aquatic Macrofauna, if applicable). Summary should indicate vegetative coverage % of species across entire transect(s). If applicable, survivorship data should be submitted for planted tree species. Summary may also be broken down into the community types or ecotones. Provide an overall summary of site conditions including any onsite events that may have occurred since last monitoring event (e.g. fires, encroachment violations, replantings, erosion etc.). Also, the summary could include recommendations for addressing any deficiencies with the permitted mitigation plan.

Project Maintenance - Wetland maintenance methodology should be submitted with the Baseline Report * or with the Time Zero Report** upon completion of the mitigation objective (creation, restoration, enhancement or preservation). **Note: changes in exotic and nuisance vegetation eradication methodology need to be approved by the District's Environmental Compliance staff prior to implementation.** The plan should address removal of exotic and nuisance plant species and maximum of 5 % nuisance plant species and assure an 80% coverage or appropriate survival rate for planted or recruited species.

* Baseline Report – Monitoring conducted prior to construction

** Time Zero Report – Monitoring conducted after completion of initial mitigation activities

Other Items

Financial Assurances – Pursuant to Section 4.3.3.2 (p) of the Basis of Review for mitigation plans with projected implementation costs in excess of \$25,000, the permittee shall submit a financial assurance mechanism in the amount of 110% of the itemized cost of implementing the mitigation plan. Acceptable financial assurance mechanisms include approved Letters of Credit (Form No .1106),

Performance Bonds (Form No. 1105), Trust Fund Agreements, cash deposits or cash equivalent in an escrow account and several other mechanism outlined in Section 4.3.7.6 of the Basis of Review, Pages 39-40. Partial Releases of the financial assurance mechanisms may be requested as the mitigation program progresses toward completion. The District can authorize the return and release of portions of these funds provided that the project is in compliance.

Mitigation Banks – Mitigation banks are large contiguous tracts of land usually established in or adjacent to national, state, or regional ecologically significant areas. Mitigation credits from these banks are sold to clients when mitigation on their project sites are not expected to succeed due to unsuitable site conditions or the future long-term viability of the wetland is highly unlikely.

An applicant typically reserves or purchases a determined amount of mitigation credits from a mitigation bank prior to or during the permitting process. Once the permit is issued, the permittee has a set time period (noted in the mitigation work schedule) in which to provide verification that the credits have been debited from the bank's ledger. Verification of mitigation credits purchased from a bank is not sufficient to meet this requirement. Once this requirement is met, the mitigation obligation of the permittee is satisfied, unless the bank credits are only a portion of the mitigation needed for the project.

Conservation Easements – A Conservation Easement (CE) is a document recorded in the public records designed to place restrictions over certain activities within a parcel of land. An easement may be granted to a governmental agency (e.g., South Florida Water Management District), charitable organization or trust whose purpose is to protect the environmental properties of a site. The easement allows the grantee the right to enforce activity restrictions on the property by injunction or other civil action and enter the land at reasonable times to make inspections.

The granting of a CE provides reasonable assurance that a mitigation or preservation area will be maintained in its natural or permitted state in perpetuity and that potential future owners will be notified of the conservation status of the parcel. There are a several types of CE's utilized to address the uniqueness of a particular project (i.e. standard, riparian, passive recreation and third party enforcement).

Conservation easements are typically fully executed prior to permit issuance. The document is then attached to the permit, as an exhibit, with a specified timeframe for recordation. Once recorded, the CE (original or certified –blue stamped) is submitted to the District along with a digital CAD (.dxf) or GIS (ESRI Coverage) formatted cd. The files should be in the Florida State Plane coordinate system, East Zone (3601) with a data datum of NAD83, HARN with map units in feet. The data should be overlaid on a recent geo-referenced aerial map so that the permittee and the District can easily verify the accuracy of the data.

Conservation easements 100 acres or larger in size must go through additional review prior to recording. A signed and sealed boundary survey for the conservation easement area and title commitment documents must be provided to the District for review and verification. Submit certified boundary survey as described in FL Administrative Code 61G17-6, under the supervision of a Florida Licensed Surveyor and Mapper. The boundary survey is sent to the District's Engineering and Project Management Department and is reviewed by a surveyor and mapper for correctness. The title commitment documents and a copy of the boundary survey are sent to a District authorized real estate attorney. The attorney reviews the title commitment for any deficiencies or encumbrances (liens, easements, mineral rights, etc.) which may be contrary to the District's interest. Any deficiencies noted in the boundary survey review or the title commitment review are communicated to the permittee for correction. Once the boundary survey and title commitment are found to be in order the conservation easement can be recorded by the permittee.

As-built Drawings - As-built drawings are actual measured drawings based on the permit design drawings used during construction. In mitigation projects, these drawings are usually a requirement for wetland creation, wetland vertical relocation and/or other mitigation projects requiring any type of elevation scrapedown. These drawings provide a topographic (typically 0.1 foot contours) map of the mitigation area. As-built drawings can vary slightly from the permitted design due to construction field adjustments (e.g., to save some desirable vegetation. These field adjustments require prior District staff approval.

The purpose of submitting as-built drawings is to provide assurance that the scrapedown elevations meet or approximate the permitted mitigation design and that the site can accommodate the approved planting plan. Sometimes, based on the as-built drawings, additional scrapedown is required. The drawings need to be submitted prior to the installation of any plant material or demobilization of the earthmoving equipment.

GPS Readings and Aerial Overlays– Utilize GPS to map the outside boundary of the conservation easement in order to provide baseline information for future reference. Early measurements can assist in the detection of buffer/wetland encroachments (see example of GPS readings on an aerial map overlay in Appendix 7) during project construction as well as later during perpetual monitoring inspections. Specified encroachments on conservation easement boundaries must be conducted with survey quality GPS equipment capable of survey level accuracy.

It is important that the number of initial wetland boundary stakes be sufficiently spaced to accurately reflect the true wetland boundary. Failure to take this into consideration will result in mapping errors. And as indicated above, certified boundary surveys need to be submitted in the form as described in FL Administrative Code 61G17-6, under the supervision of a Florida Licensed Surveyor and Mapper.

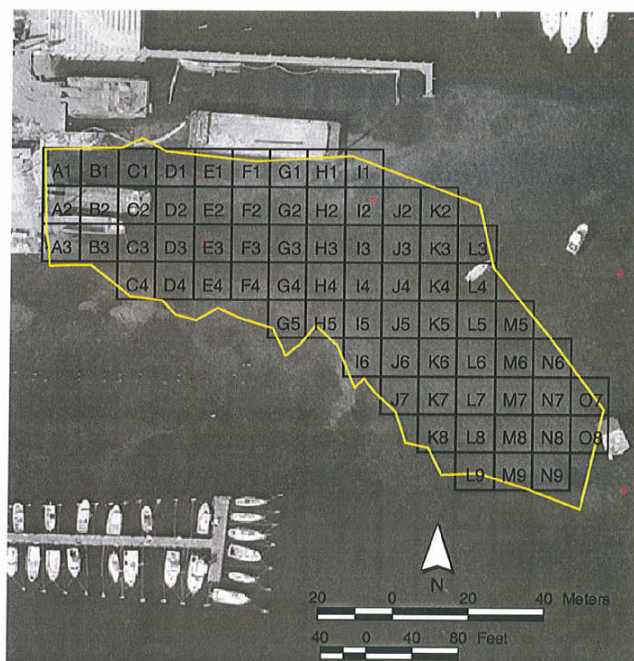
Wetland Assessment Procedures – Wetland assessment procedures are tools in the trade of wetland science that provide a procedure for characterizing , identifying and measuring wetland functions. In Environmental Resource Permits (ERP), a permittee is sometimes required to provide an annual update as to the ecological improvement of the wetland mitigation project, using a wetland assessment method. The current methodology required by the Florida Department of Environmental Protection (FDEP) and the Florida’s water management districts is the Uniform Mitigation Assessment Method (UMAM).

Projects (with onsite wetlands) are typically evaluated pre-construction, using UMAM, to establish the amount of mitigation needed to offset acceptable wetland impacts and to establish a baseline for wetland mitigation functional improvements. Target UMAM scores are set as a measurement of mitigation success. Alternative assessment methodologies have been and are still utilized (e.g. Wetland Rapid Assessment Procedure – WRAP and Hydrogeomorphic Assessment Method - HGM) in some circumstances (i.e. a project has to be evaluated with the same methodology that was used to establish the mitigation bank if the permittee plans on utilizing credits from that bank).

Mangrove Trimming – Sections 403.9321-403.9333 of the Florida Statutes are designated as the “Mangrove Trimming and Preservation Act”. Both the District and FDEP have jurisdiction over mangrove trimming. Typically the District will address mangrove trimming issues if an ERP permit is issued for the project. Single family residential projects apply to the FDEP for mangrove trimming permits. There are provisions for exempt mangrove trimming in the Mangrove Trimming and Preservation Act. If mangrove trimming activities took place after submittal of an annual monitoring report, an update on these activities should be included in the next annual monitoring report.

Appendix 1

Permanent Grids for a Seagrass Survey Area



Impact Area
■ Water Quality Monitoring Sites
 Sampling Grid

Figure 5. Proposed seagrass and water quality monitoring sites and methodology. Restoration will be monitored with bi-annual surveys of 89 - 10m x 10m permanent grids.

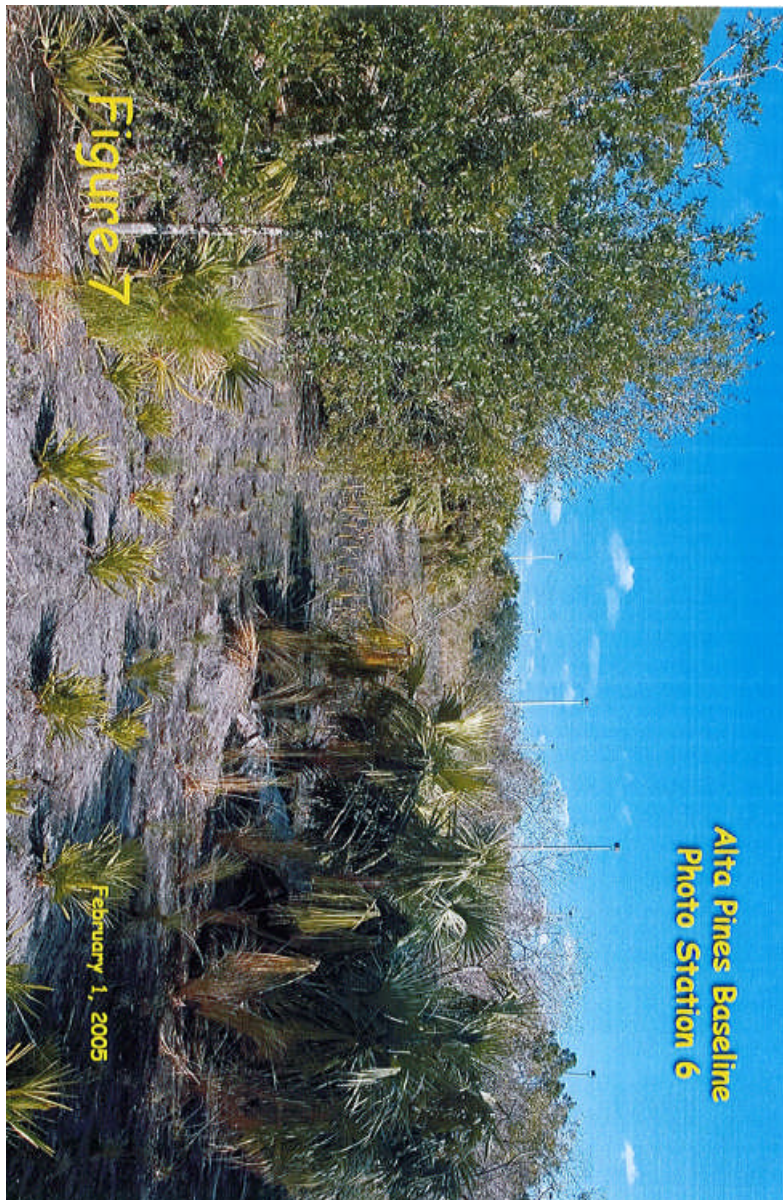
Appendix 2

Map of a Seagrass Survey



Appendix 3

Date stamped Photograph at Permanent Photostation



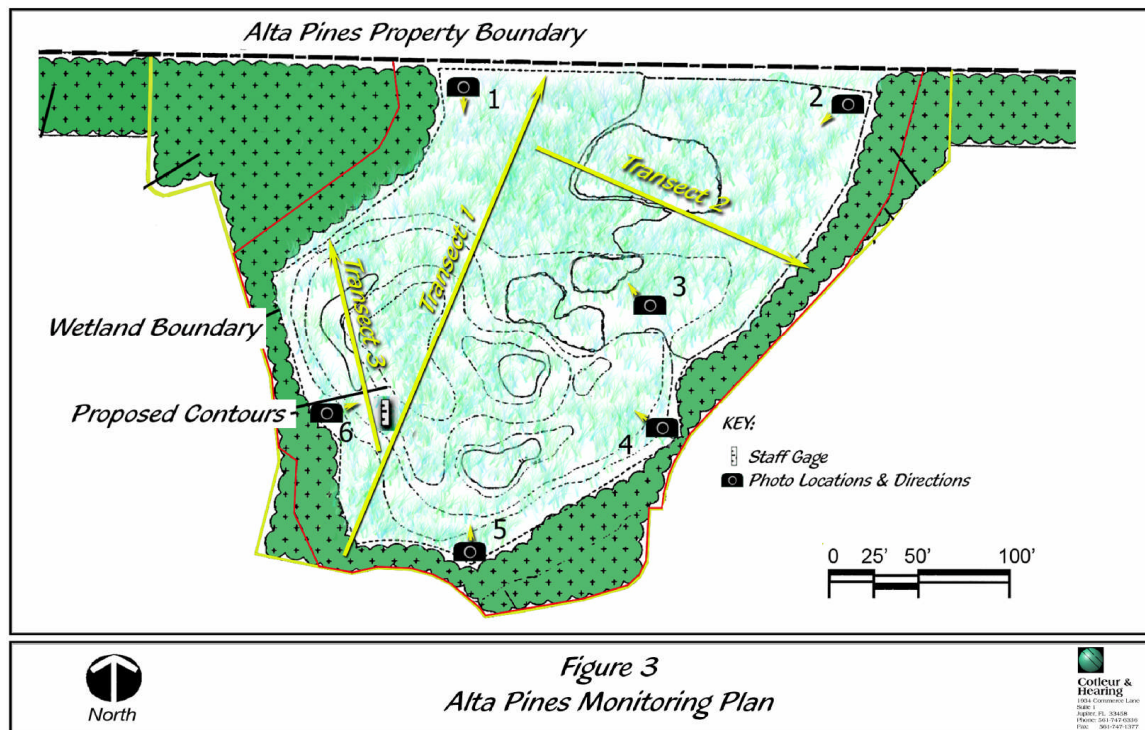
Appendix 4

Water Level Staff Gauge



Appendix 5

Drawing indicating Locations of Transects, Photostations and Staff Gauge



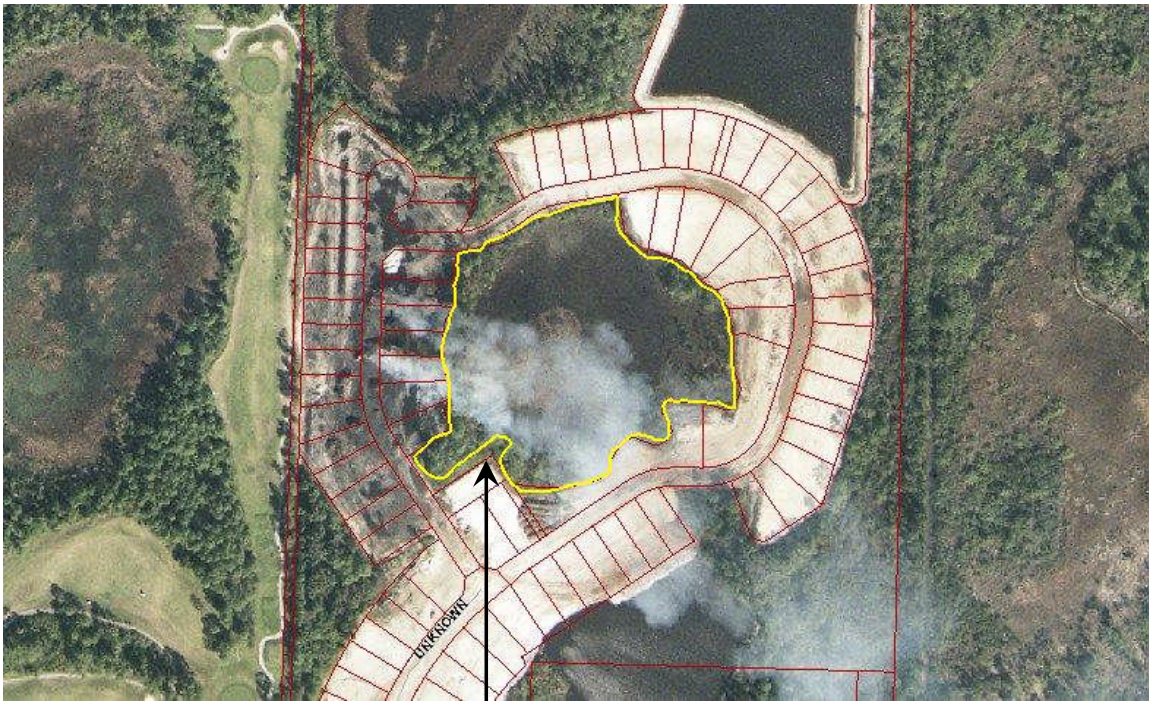
Appendix 6

Bathymetric Restoration Map



Appendix 7

GPS Readings (light colored line) overlaid on Aerial Map which includes platted County Property Appraiser Boundaries (note encroachment on lower left corner of wetland)



Note encroachment at arrow



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

3301 Gun Club Road – P.O. Box 24680 – West Palm Beach, FL 33416-4680
(561) 686-8800 – 1-800-432-2045